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## An Effect of Cathode Rays on Photographic Paper

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## PSYCHOPHYSICAL ANALYSIS OF COLOR BLINDNESS

A. A. BENEDICT

Owing to the fact that color blindness is seemingly quite an intangible phenomenon and that there are several theories, one of which has often been accepted by the experimenter so that the results are usually somewhat biased, we find that the results vary quite considerably when tests are made by the different methods.

A very interesting type of test which has been used for some time consists of a set of cards or plates on which a letter or number is seen in spots of one color on a background of spots of another color. Ishihara, in his method, applies the above principle, and in addition, use is made of the fact that, for the red-green blind, the yellow, blue, and violet colors of the spectrum are remarkably bright compared to the reds and the greens. Thus, in his tests, the intensity of these three colors is subdued as compared with the intensity of the red and green. Also, in the Ishihara test, the colors in the number are usually so arranged that, when the normal eye sees one number, the red-green blind individual sees a different number and sees it very distinctly so that he reads the cards promptly and with assurance.

In the work described here, the results found in the Ishihara test are compared and correlated with those using the Holmgren's yarn test and with the test previously described using the relatively pure spectral colors of the spectrophotometer.

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AN EFFECT OF CATHODE RAYS ON PHOTO-  
GRAPHIC PAPER

P. H. CARR

When photographic printing out or developing out paper is exposed to cathode rays in air (Lenard rays) for a sufficient time, it undergoes a color change similar to but not quite like that produced by exposure to light. It has been noted that, when a sample of the photographic paper is exposed to Cathode rays, it is rendered relatively insensitive to subsequent exposure to light. This peculiar effect is not observed when developing agents are used on the developing out paper, nor is it observed on blue print paper.

Investigation indicates that the desensitizing effect of the cathode ray exposure can be simulated by application of heat, although the temperature to which the emulsion must be raised is surprisingly high. Experiments with other materials indicate that local temperatures in the rayed object may be very high. The importance of this finding has not been appreciated by those working in biological fields.

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### THE M-SERIES ABSORPTION SPECTRUM OF METALLIC BISMUTH

W. D. PHELPS

Using a Siegbahn vacuum spectrometer and thin films of bismuth produced by sputtering, the wavelengths of the five x-ray M-absorption edges of bismuth 83 have been measured. For the edges  $M_1$  and  $M_2$ , which had not previously been measured, the discrepancy between the computed and observed values is of the order of magnitude of experimental error while the usual large  $M_4$  and  $M_5$  discrepancies, first observed in this laboratory on other elements, are verified for bismuth. An interpretation of the large discrepancies between the experimental and computed wavelengths of the edges  $M_4$  and  $M_5$  based on experiments in other fields on the one hand and Block's and Kronig's wave-mechanical theory of energy levels in a crystal on the other is suggested. It is concluded that the  $M_1$ ,  $M_2$ , and  $M_3$  electron in an absorption act go to the top of the filled free-electron levels while the  $M_4$  and  $M_5$  electrons go on out to higher energy levels of the crystal lattice.

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### A STUDY OF THE CYBOTACTIC GROUP STRUCTURE IN ISOPENTANE NEAR THE CRITICAL POINT

CARL A. BENZ

X-ray diffraction curves of scattered intensity as a function of angle have been measured using a Coolidge Molybdenum x-ray tube, and an ionization chamber spectrometer.